network

Flashlink User Manual

AES-OE

AES Optical to Electrical Converter

Rev. 4

network-electronics.com

Revision history

The latest version is always available in pdf-format on our web site:

http://www.network-electronics.com/

Current revision of this document is the uppermost in the table below.

Revision	**Replaces**	**Date**	Change Description
4	3	2007-10-23	New front page and removed old logo.
3	2	2007-09-07	Added Materials Declaration and EFUP; updated EC Declaration of Conformity.
2	1	2007-01-05	Updated wavelength range
1	0	29.03.05	Updated GPI pinning description
0	A	01.11.01	Final first release.
A		04.09.01	Preliminary version

Index

1. General....4
2. Specifications....5
3. Connector module....6
3.1 Mounting the connector module....6
3.2 Connector Pin Assignments....7
3.3 Line Termination....7
4. Module status....7
4.1 GPI – Module Status Outputs....8
4.2 Front Panel - Status Monitoring....9
5. Laser safety precautions....10
General environmental requirements for Network flashlink® equipment....11
Product Warranty....12
Materials declaration and recycling information....13
Materials declaration....13
Environmentally-friendly use period....13
Recycling information....14
EC Declaration of Conformity....15

1. General

The flashlink AES-OE provides an economical solution for receiving AES/EBU digital audio signals from a fiber optic cable. AES-OE is used where digital audio shall be transported independent of video. On the transmitter side an AES-EO is used to encode the optical signal. The AES-OE used together with an AES-EO allows transmission of AES/EBU signals for distances over 60km.

When access to fiber is limited, AES-OE can be combined with the flashlink optical multiplexing WDM or DWDM products. The AES-OE module is supplied together with the AES-C1 connector module.

The optical input is made with a PIN diode, with built-in TIA and AGC, for reception in the 2nd and 3rd optical windows (1200 to 1620 nm).

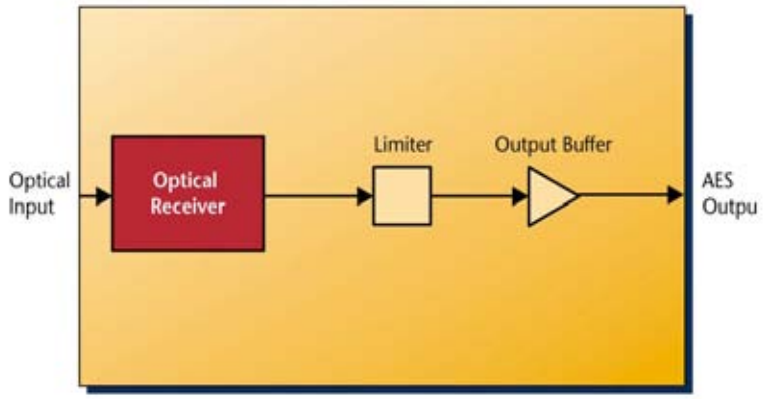


Figure 2. AES Optical to Electrical Converter Block Diagram

2. Specifications

Output

Signal format:	AES-3 (AES/EBU)
Impedance:	110 ohm (transformer balanced)
Jitter:	< 20ns
Connector:	DB25 female (Tascam pin layout)

Electrical

Voltage:	+5V DC
Power:	1.4 Watts
Control:	RS-422 with protocol for use with GYDA System Controller. Control system has access to set-up and module status with BITE (Built-In Test Equipment).

Optical Input

Sensitivity:	better than -30dBm
Max. input power:	-3dBm
Optical wavelengths:	1200nm – 1620nm
Transmission circuit fiber:	Multi Mode 50/125µm, Single Mode 9/125µm compatible
Return loss:	> 26dB
Connector:	SC/UPC, Return Loss better than 40dB

3. Connector module

The AES-OE has a dedicated connector module: AES-C1. This module is mounted at the rear of the sub-rack. The module is shown in figure 2.

To set up a link, one AES-EO and one AES-OE have to be used. The AES cable is connected to AES on each of the AES-EO / AES-OE modules. The connector pin layout is according to the Tascam standard.

The TX UPG is not in use for the AES-OE.

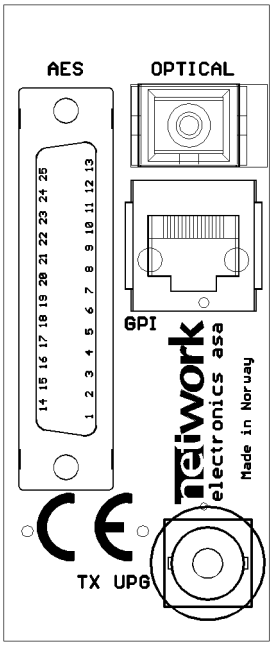


Figure 2. Overview of the AES connector module

3.1 Mounting the connector module.

This section only applies if the module is not purchased pre-mounted in a sub-rack.

The details of how the connector module is mounted, is found in the user manual for the sub-rack frame FR-2RU-10-2.

This manual is also available from our web site: http://www.network-electronics.com/

3.2 Connector Pin Assignments

The AES/EBU signal is connected to the AES connector, positioned as shown in figure 2. The connector is a DB25, 25-pin DSUB type.

AES pin layout:

Signal	**Name**	**Pin #**	**Mode**
CH1 +	Receive AES Positive for **AES-EO**	Pin 24	Input
CH1 -	Receive AES Negative for **AES-EO**	Pin 12	Input
CH1 GND	Ground connection for shield	Pin 25	Ground
CH5 +	Transmit AES Positive for **AES-OE**	Pin 18	Output
CH5 -	Transmit AES Negative for **AES-OE**	Pin 6	Output
CH5 GND	Ground connection for shield	Pin 19	Ground

3.3 Line Termination

The AES-OE module has a built in 110 ohm resistor in series with the transmitter output terminal. This output is also transformer balanced enabling interfacing with long cables.

4. Module status

The status of the module can be monitored in three ways.

1. GYDA System Controller.
2. GPI at the rear of the sub-rack.
3. LED’s at the front of the sub-rack.

Of these three, the GPI and the LED’s are mounted on the module itself, whereas the GYDA System Controller is a separate module giving detailed information of the status of the card. The functions of the GPI and the LED’s are described in sections 4.1 and 4.2. The GYDA controller is described in a separate user manual.

4.1 GPI – Module Status Outputs

These outputs can be used for wiring up alarms for third party control systems. The GPI outputs are open collector outputs, sinking to ground when an alarm is triggered. The GPI connector is shown in figure 2.

Electrical Maximums for GPI outputs
Max current: 100mA
Max voltage: 30V

AES-OE module GPI pin layout:

Signal	Name	Pin #	Mode
Status	General error status for the module.	Pin 1	Open Collector
LOS	Los Of optical input Signal	Pin 2	Open Collector
Ground	0 volt pin	Pin 8	0V.

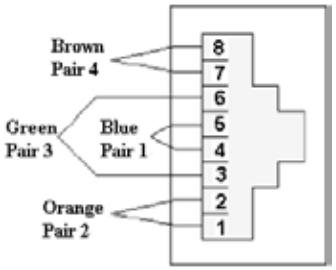
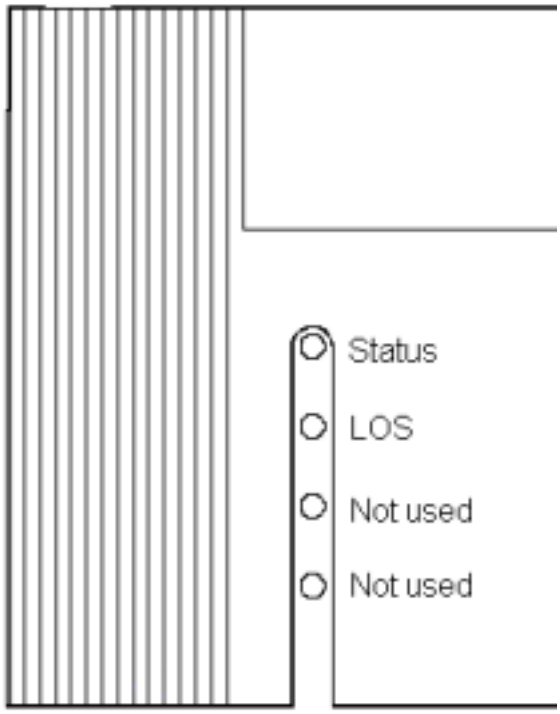


Figure 3: GPI Outlet

4.2 Front Panel - Status Monitoring

The status of the module can be easily monitored visually by the LED's at the front of the module. The LED's are visible through the front panel as shown in figure 4.



(Text not printed on the front panel).

Figure 4. Front panel indicator overview for AES-OE

The AES-OE has 2 LED's each showing a status corresponding to the GPI pin layout. The position of the different LED's is shown in figure 4.

Diode \ state	**Red LED**	**Green LED**	**No light**
Status	Module is faulty	Module is OK Module power is OK	Module has no power
LOS	Loss of signal No optical input signal.	Optical input signal present	

5. Laser safety precautions

Guidelines to limit hazards from laser exposure.

All the available EO units in the flashlink® range include a laser.

Therefore this note on laser safety should be read thoroughly.

The lasers emit light at wavelengths around 1310 nm or 1550 nm. This means that the human eye cannot see the beam, and the blink reflex cannot protect the eye. (The human eye can see light between 400 nm to 700 nm).

A laser beam can be harmful to the human eye (depending on laser power and exposure time). Therefore:

!! BE CAREFUL WHEN CONNECTING / DISCONNECTING FIBER PIGTAILS (ENDS).

NEVER LOOK DIRECTLY INTO THE PIGTAIL OF THE LASER/FIBER.

NEVER USE MICROSCOPES, MAGNIFYING GLASSES OR EYE LOUPES TO LOOK INTO A FIBER END.

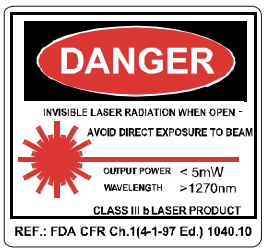
USE LASER SAFETY GOGGLES BLOCKING LIGHT AT 1310 nm AND AT 1550 nm

Instruments exist to verify light output power: Power meters, IR-cards etc.

flashlink® features:

All the laser module cards in the flashlink® product range, are Class 1 laser products according to IEC 825-1 1993, and class I according to 21 CFR 1040.10 when used in normal operation.

More details can be found in the user manual for the FR-2RU-10-2 frame.
Maximum output power*: 5 mW.
Operating wavelengths: > 1270 nm.
**Max power is for safety analysis only and does not represent device performance.*



General environmental requirements for Network flashlink® equipment

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:

- Operating room temperature range 0°C to 50°C
- Operating relative humidity range up to 90% (non-condensing)

2. The equipment will operate without damage under the following environmental conditions:

- Temperature range -10°C to 55°C
- Relative humidity range up to 95% (non-condensing)

Product Warranty

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Network Electronics ASA. These conditions are available on the company web site of Network Electronics ASA:

www.network-electronics.com

Materials declaration and recycling information

Materials declaration

For product sold into China after 1st March 2007, we comply with the "Administrative Measure on the Control of Pollution by Electronic Information Products". In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 Part Name	Toxic or hazardous substances and elements					
	鉛 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
AES-OE	X	O	O	O	O	O

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

Environmentally-friendly use period

The manual must include a statement of the "environmentally friendly use period". This is defined as the period of normal use before any hazardous material is released to the environment. The guidance on how the EFUP is to be calculated is not finalised at the time of writing. See http://www.aeanet.org/GovernmentAffairs/qfLeOpAaZXaMxqGjSFbEidSdPNtpT.pdf for an unofficial translation of the draft guidance. For our own products, Network Electronics has chosen to use the *50 year figure* recommended in this draft regulation.

Network Electronics suggests the following statement on An "Environmentally Friendly Use Period" (EFUP) setting out normal use:

> **EFUP is the time the product can be used in normal service life without leaking the hazardous materials. We expect the normal use environment to be in an equipment room at controlled temperature range (0ºC - 40ºC) with moderate humidity (< 90%, non-condensing) and clean air, not subject to vibration or shock.**

Further, a statement on any hazardous material content, for instance, for a product that uses some tin/lead solders:

> **Where a product contains potentially hazardous materials, this is indicated on the product by the appropriate symbol containing the EFUP. The hazardous material content is limited to lead (Pb) in some solders. This is extremely stable in normal use and the EFUP is taken as 50 years, by comparison with the EFUP given for Digital Exchange/Switching Platform in equipment in Appendix A of "General Rule of Environment-Friendly Use Period of Electronic Information Products". This is indicated by the product marking:**

It is assumed that while the product is in normal use, any batteries associated with real-time clocks or battery-backed RAM will be replaced at the regular intervals.

The EFUP relates only to the environmental impact of the product in normal use, it does not imply that the product will continue to be supported for 50 years.

Recycling information

Network Electronics provides assistance to customers and recyclers through our web site http://www.network-electronics.com. Please contact Network Electronics' Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Network Electronics or its agents for recycling, the following general information may be of assistance:

Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.

All major parts are marked or labelled to show their material content.

Depending on the date of manufacture, this product may contain lead in solder.

Some circuit boards may contain battery-backed memory devices.

EC Declaration of Conformity

MANUFACTURER	Network Electronics ASA P.B. 1020, N-3204 SANDEFJORD, Norway	
AUTHORISED REPRESENTATIVE (Established within the EEA)	Not applicable	
MODEL NUMBER(S)	AES-OE	
DESCRIPTION	AES Optical to Electrical Converter	
DIRECTIVES this equipment complies with	LVD 73/23/EEC EMC 89/336/EEC	
HARMONISED STANDARDS applied in order to verify compliance with Directive(s)	EN 55103-1:1996 EN 55103-2:1996 EN 60950-1:2006	
TEST REPORTS ISSUED BY	**Notified/Competent Body**	**Report no:**
	Nemko	10689
TECHNICAL CONSTRUCTION FILE NO	Not applicable	
YEAR WHICH THE CE-MARK WAS AFFIXED	2004	
TEST AUTHORIZED SIGNATORY		
MANUFACTURER	**AUTHORISED REPRESENTATIVE (Established within EEA)**	**Date of Issue** 2007-09-07
NETWORK ELECTRONICS ASA O.nr. 976 584 201 MVA	Not applicable	**Place of Issue** Sandefjord, Norway
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